Remarks:

Status of Claims

Claims 1-14 were previously pending with claims 1, 7, 11, and 14 being independent.

Rejections Under 35 U.S.C. § 102(b)

In the Office Action of July 25, 2006, the Examiner rejected claims 1-13 under 35 U.S.C. § 102(b) as being anticipated by Rutt (U.S. Patent No. 3,772,748). Applicant respectfully submits that Rutt and the other prior art of record fail to disclose or suggest all the features of independent claims 1, 7, and 11 of the present invention, including placing a circuit component onto an individual layer of substrate, firing the layer of substrate and the circuit component printed thereon, adjusting the circuit component to achieve a desired degree of precision, applying a bonding agent to an individual layer of substrate and assembling that layer of substrate to one or more other layers of substrate, and firing the assembled layers of substrate to activate the bonding agent to bond the layers and create the monolithic structure.

Applicant notes that the Examiner failed to cite any specific passages from Rutt in the rejection. Applicant, however, has cited specific passages from Rutt where appropriate. Rutt generally discloses a method of creating multilayer ceramic capacitors, although the method could also be applied to the creation of multilayer circuit structures. Rutt's method begins with creating thin sheets of ceramic dielectric material onto which is patterned a temporary fugitive bond material in a desired configuration. The sheets of ceramic dielectric material are stacked 10 or 15 high and then cut into chips which are heated to form a multilayer structure (column 3, lines 26-43 and Examples 1-5). The temporary fugitive bond material decomposes upon heating to create a void into which metal is deposited later in the process.

In contrast, the methods of claims 1, 7, and 11 of the present invention recite printing material onto a ceramic substrate that *does not* disintegrate upon heating. Specifically, claim 1 recites the step of printing a circuit component onto an individual layer of substrate; claim 7 recites printing a circuit component onto an individual layer of thick film ceramic substrate; and claim 11

recites screen-printing a plurality of circuit components onto a plurality of individual layers of thick film ceramic substrate. The cited circuit components are not temporary placeholders for material that is added later as in Rutt, but rather are permanent elements of the monolithic circuit structure.

Since Rutt does not disclose printing circuit components onto an individual layer of substrate, it also does not disclose firing the layer of substrate and the circuit component printed thereon, as cited in claims 1, 7, and 11. Specifically, claim 1 recites firing the individual layer of substrate and the circuit component printed thereon; claim 7 recites firing the individual layer of thick film ceramic substrate and the circuit component printed thereon; and claim 11 recites firing the individual layers of thick film ceramic substrate and the circuit components screen-printed thereon.

Rutt's method continues with the steps of immersing the multilayer chips in a bath of molten metal, such that the voids left by the decomposition of the fugitive bond material from the previous steps are filled with the metal (Examples 6-11). Finally, electrodes are attached, in the case of producing multilayer capacitors (Examples 6-12), or leads are attached where desired, for multilayer circuits (column 12, lines 20-25). In his method, Rutt fails to disclose or suggest adjusting the circuit components to achieve a desired degree of precision. This is primarily because Rutt fails to disclose printing circuit components on individual layers of substrate. However, more importantly, conductors located on the inner layers of Rutt's stacked structure are not operable to be adjusted. Adjustment of conductors generally requires access to the conductive traces that are located on the substrate. Since the conductive material is infused into Rutt's stacked structure *after* the structure has been formed, it is not possible to access the traces for adjustment without destruction of or at least significant damage to the multilayer structure.

In contrast, the methods of claims 1, 7, and 11 of the present invention recite adjusting the circuit components to achieve a desired degree of precision. Specifically, claim 1 recites the step of adjusting the circuit component as necessary to achieve a desired degree of precision; claim 7 recites the step of trimming the circuit component as necessary to achieve a desired degree of precision; and claim 11 recites the step of trimming the circuit components as necessary to achieve a desired degree of precision. Since the steps cited are performed after the components are printed

onto the substrate and *before* the layers are stacked, it is possible to adjust the components as desired without damage to or destruction of the multilayer structure.

Furthermore, Rutt fails to suggest or disclose the step of applying a bonding agent to an individual layer of substrate and assembling that layer of substrate to one or more other layers of substrate. Rutt's method calls for fugitive bond material to be patterned onto a sheet of substrate as desired. The sheets of substrate are stacked and then cut into chips, which are heated to form a multilayer structure (column 3, lines 26-43 and Examples 1-5). Rutt's method does not disclose using a bonding agent between layers of substrate, as cited in claims 1, 7, and 11 of the present invention. Specifically, claim 1 recites applying a bonding agent to the individual layer of substrate and assembling the individual layer of substrate with one or more other layers of substrate; claim 7 recites applying a bonding agent to the individual layer of thick film ceramic substrate and assembling the individual layer of thick film ceramic substrate with one or more other layers of thick film ceramic substrate; and claim 11 recites applying a thick film glass bonding agent to the individual layers of thick film ceramic substrate and assembling the individual layers of thick film ceramic substrate.

Finally, since Rutt fails to disclose applying a bonding agent between layers of substrate, it also fails to disclose firing the assembled layers of substrate to activate the bonding agent to bond the layers and create the monolithic structure, as cited in claims 1, 7, and 11. Specifically, claim 1 recites firing the assembled individual layer of substrate and one or more other layers of substrate together to activate the bonding agent, thereby bonding the individual layer of substrate to the one or more other layers of substrate and creating the monolithic circuit structure; claim 7 recites firing the assembled individual layer of thick film ceramic substrate and one or more other layers of thick film ceramic substrate together to activate the bonding agent, thereby bonding the individual layer of thick film ceramic substrate to the one or more other layers of thick film ceramic substrate and creating the multi-layered monolithic circuit structure; and claim 11 recites firing the assembled individual layers of thick film ceramic substrate to sinter the thick film glass bonding agent, thereby

bonding the individual layers of thick film ceramic substrate together and creating the multi-layered monolithic circuit structure.

In summary, Applicant respectfully submits that claims 1, 7, 11, and all the claims that depend therefrom are not anticipated or rendered obvious by Rutt, as Rutt fails to suggest or disclose placing a circuit component onto an individual layer of substrate, firing the layer of substrate and the circuit component printed thereon, adjusting the circuit component to achieve a desired degree of precision, applying a bonding agent to an individual layer of substrate and assembling that layer of substrate to one or more other layers of substrate, and firing the assembled layers of substrate to activate the bonding agent to bond the layers and create the monolithic structure.

Rejections Under 35 U.S.C. § 103(a)

The Examiner rejected claim 14 under 35 U.S.C. § 103(a) as being unpatentable over Rutt (U.S. Patent No. 3,772,748) in view of Naumov et al. (U.S. Patent No. 6,875,950). Applicant respectfully submits the combination of these two references does not disclose or suggest all the features of claim 14. In addition, there is no desire or motivation to combine the two references as the Examiner suggests.

Rutt's disclosure is discussed above. Naumov discloses a method and apparatus for the laser trimming of passive circuit elements such as resistors, capacitors, and inductors. Naumov does not disclose or suggest any methods for creating multilayer monolithic circuit structures. As discussed above, Rutt prints only temporary fugitive bond material – not circuit components – onto a layer of substrate. Therefore, neither Rutt, Naumov, nor the combination of the two disclose screen-printing a plurality of circuit components onto a plurality of individual layers of substrate, wherein the circuit components are selected from the group consisting of: resistors, capacitors, and inductors, and wherein the individual layers of substrate are standard alumina thick film ceramic substrate, as cited in claim 14. Also, neither Rutt, Naumov, nor the combination of the two disclose firing the individual layers of substrate and the circuit components screen-printed thereon, as cited in claim 14.

In addition, as discussed above, Rutt's method does not include using a bonding agent between layers of substrate. As a result, neither Rutt, Naumov, nor the combination of the two disclose applying a thick film glass bonding agent to the individual layers of substrate and assembling the individual layers of substrate, as cited in claim 14. Likewise, neither Rutt, Naumov, nor the combination of the two disclose firing the assembled individual layers of substrate to sinter the thick film glass bonding agent, thereby bonding the individual layers of substrate together and creating the multi-layered monolithic circuit structure, as cited in claim 14.

Applicant respectfully submits that claim 14 of the present invention is patentable over Rutt in view of Naumov because neither Rutt, Naumov, nor the combination of the two disclose key elements of claim 14 such as screen-printing a plurality of circuit components onto a plurality of individual layers of substrate, wherein the circuit components are selected from the group consisting of: resistors, capacitors, and inductors, and wherein the individual layers of substrate are standard alumina thick film ceramic substrate; firing the individual layers of substrate and the circuit components screen-printed thereon; applying a thick film glass bonding agent to the individual layers of substrate and assembling the individual layers of substrate; and firing the assembled individual layers of substrate to sinter the thick film glass bonding agent, thereby bonding the individual layers of substrate together and creating the multi-layered monolithic circuit structure.

With regard to laser-trimming the circuit components as necessary to achieve a desired degree of precision, there is no desire or motivation to combine the two prior art references as the Examiner has suggested. In order to properly trim a component, Naumov's system requires feedback in the form of a measurement from the sample to be trimmed to the controller of the laser (column 10, lines 52-64). To achieve feedback, Naumov's system uses a probe station to probe the component that requires adjustment (column 17, line 19 - column 18, line 15). During the trimming process, Naumov's system requires physical access, including a clearance area, in order to probe the component to be trimmed (column 23, lines 19-54). Naumov's system also requires visual access to the component and its surroundings for the vision system to recognize fiducials or other marks to direct the laser beam (column 16, line 37 - column 17, line 16). Hence, the component has to be

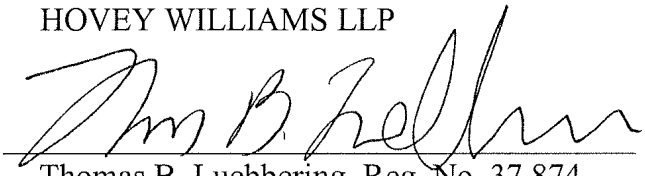
fully exposed for Naumov's system to properly trim it. In Rutt's method of forming monolithic multilayer ceramic structures, the layered structure is already formed when the metal that would have to be trimmed is added. Since Rutt's structure has already been sintered such that the layers form a monolithic unit, there is no convenient and reliable way to remove any given layer from the structure in order to expose any of the metal traces that might need trimming. Rutt's ceramic structure is not operable to be disassembled, modified, and then reassembled without destruction of or at least damage to one or more layers of the structure. Therefore, to use the laser trimming taught by Naumov in the invention of Rutt, as the Examiner suggests, would render the prior art, Rutt, unsatisfactory for its intended purpose. Thus, Applicant respectfully submits that there is no desire or motivation to combine Rutt and Naumov, as the combination would violate MPEP § 2143.01 (V).

Conclusion

In view of this response and the remarks herein, Applicants respectfully submit that claims 1-14 are in allowable condition and requests a corresponding Notice of Allowance. In the event of further questions, the Examiner is urged to call the undersigned. Any additional fee which might be due in connection with this application should be applied against our Deposit Account No. 19-0522.

Respectfully submitted,

HOVEY WILLIAMS LLP

BY: 

Thomas B. Luebbering, Reg. No. 37,874
2405 Grand Blvd., Suite 400
Kansas City, Missouri 64108
(816) 474-9050

ATTORNEYS FOR APPLICANT(S)

(Docket No. 34282)